Commissioner for Patents
Page 2

AMENDMENTS TO THE CLAIMS

This listing of the claims replaces all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS

1. (Cancelled)

2. (Currently Amended)   A system as claimed in claim ~~1~~ 8 further comprising a service manager adapted to receive the requests for service, and exchange admission control signaling messages with edge network elements.

3. (Original) A system as claimed in claim 2 further comprising a capacity manager adapted to:

receive a request for connection capacity between specified network elements;

determine if there is available capacity to satisfy the request on an existing communications channel between the specified network elements;

if there is available capacity on an existing communications channel, allocate the capacity to the service request, and return a message to the service manager identifying the existing communications channel; and

if a communications channel with available capacity does not exist to send a message to the WRM requesting that a channel be set up to satisfy the service request.

4. (Cancelled)

5. (Currently Amended)   A system as claimed in claim ~~4~~ 8 wherein the route selector further comprises a route evaluation algorithm adapted to:

determine a value associated with at least one of a number of optical links in the route; a sum of lengths of the optical links in the route; and, a sum of costs associated with each optical link in the route, for each route evaluated; and

DOCSOTT: 416745\1

Commissioner for Patents   Serial No.: 09/974,907
Page 3

use the determined value of each route to select a route with a preferred value.

6.   (Cancelled)

7.   (Currently Amended)   A system as claimed in claim 6—8 wherein the
wavelength selector is further adapted to access a data store in order to retrieve at
least one of wavelength utilization information, and regeneration opportunity
information.

8.   (Currently Amended)   A system for adaptively controlling communications
channels in a wavelength division multiplexing (WDM) optical network that performs
wavelength selective switching, the system comprising:

    a wavelength and route manager (WRM) that determines a communications
        channel to be set up to satisfy a request for service between two network
        elements (A and B) using:

    a channel selection algorithm that uses at least one rule abstracted from a physical
        constraint on signal transmission through the optical network to select at
        least one wavelength for providing the communications channel between A
        and B, the channel selection algorithm comprising: a route selector adapted
        to select a route between A and B from a set of routes in accordance with at
        least one selection criterion, and a wavelength selector adapted to select the
        at least one wavelength for the communications channel on the selected
        route subject to the following constraints: each of the at least one
        wavelengths is not indicated to be currently used on any section in the route;
        if regeneration is required, a regenerator is available to regenerate the at
        least one wavelength in response to regeneration opportunity information;
        andA system as claimed in claim 7 wherein the wavelength selector is
        further adapted further adapted to obtain a distance traversed between A and
        B over the selected route, and to compare the distance with a predefined
        regeneration threshold in order to estimate a number (R) of regenerations

Commissioner for Patents   Serial No.: 09/974,907
Page 4

required for a channel on the route, R being used to select R available regeneration points on the route.—;

a constraint-based route validator for verifying that the at least one wavelength is viable by calculating a link budget and determining settings for transmission equipment that supports the communications channel between A and B; and

means for effecting the setup of the at least one wavelength between A and B to provide the communications channel if the constraint-based route validator determines that the route is valid.

9.   (Previously Presented)   A system as claimed in claim 8 wherein the wavelength selector is further adapted to:

generate sets of R regeneration points;

evaluate the respective sets of R regeneration points in accordance with at least one criteria; and

select a set of regeneration points that achieves a highest evaluation among the sets evaluated.

10.   (Currently Amended)   A system as claimed in claim 1—8 wherein the constraint-based routing validator receives an identifier of the at least one wavelength selected by the WRM, and is adapted to:

parse the at least one wavelength into respective sections;

obtain parameters of transmission equipment in each of the sections; and

communicate the settings to the transmission equipment that supports the communications channel between A and B .

11.   (Original)   A system as claimed in claim 10 wherein the sections are defined by a route selected by the WRM.

DOCSOTT: 416745\1

Commissioner for Patents   Serial No.: 09/974,907

Page 5

12.   **(Original)** A system as claimed in claim 10 wherein the constraint-based route validator is further adapted to interface with a photonic control plane adapted to:

       store values of stable properties of transmission equipment and sections in the network; and

       request transmission equipment status information directly from the transmission equipment.

13.   **(Previously Presented)** A system as claimed in claim 10 wherein the constraint-based routing validator further determines equipment availability to ensure that the at least one wavelength is available, and that the transmission equipment in the route is operating within established parameters; and, evaluates signal transmission viability across each of the at least one wavelength by calculating the link budget and determining the settings for the transmission equipment.

14.   **(Previously Presented)** A system as claimed in claim 13 wherein the evaluation of signal transmission viability determines the parameter values for transmission equipment that are used to provide coarse grain settings for the transmission equipment, and the constraint-based routing validator is further adapted to send respective messages to the transmission equipment directing the transmission equipment to set transmission parameters for the channel.

15.   **(Original)** A system as claimed in claim 14 wherein the evaluation involves sending a low-power test signal through the channel.

16.   **(Original)** A system as claimed in claim 14 wherein the evaluation involves generating a mathematical simulation of a signal transmitted through the channel, taking into account the transmission equipment in each of the sections that the channel traverses.

DOCSOTT: 416745\1

17.   (Original) A system as claimed in claim 13 wherein the constraint-based routing validator is further adapted to return a message to the WRM indicating that the channel is viable.

18.   (Cancelled)

19.   (Currently Amended)   A method as claimed in claim ~~18~~ 23 wherein the step of generating a plausible communications channel comprises steps of:

selecting a route from a predefined set of routes between A and B; and

selecting at least one wavelength that is unused by sections in the selected route according to wavelength utilization information.

20.   (Original) A method as claimed in claim 19 wherein the step of selecting a route comprises a step of evaluating each of the routes in the predefined set using at least one predefined criterion, and selecting the route that achieves a highest evaluation.

21.   (Original) A method as claimed in claim 20 wherein the step of evaluating each of the routes further comprises steps of:

determining a value for each route at least one of a number of sections in the route, a sum of amplifiers in links in the route, a sum of lengths of the sections in the route, and, a sum of cost values associated with each section in the route; and

comparing the determined values of the routes to select a route that receives an optimal value.

22.   (Original) A method as claimed in claim 21 wherein the step of generating further comprises a step of accounting for at least one of the following considerations: reliability of the route; existence of protection fiber along the route; and a cost of leasing the optical fiber links in the route.

Commissioner for Patents   Serial No.: 09/974,907

Page 7

23.   (Currently Amended)   A method for adaptive wavelength rerouting in a wavelength division multiplexed WDM optical network that performs wavelength selective switching, in response to a request for transmission capacity between two network elements (A and B), comprising steps of:

generating a plausible communications channel using at least one rule abstracted from physical constraints on optical signal propagation through the optical network by selecting a route from a predefined set of routes between A and B; selecting at least one wavelength that is unused by sections in the selected route according to wavelength utilization information; ~~A method as claimed in claim 19 wherein the step of selecting the at least one wavelength further comprises steps of:~~ estimating a number (R) of regeneration points required for the channel; accessing regeneration opportunity information, to derive a set of regeneration points each of which currently ~~having~~ have capacity to regenerate the channel on the selected route; and selecting from among the set of regeneration points a set of R regeneration points that are sufficiently spread out so that distances between successive regeneration points in the route are less than a predefined wavelength span; and

verifying properties of transmission equipment for supporting the plausible communications channel to ensure a viability of the plausible communications channel by calculating a link budget and determining settings for the transmission equipment for supporting the communications channel.

24.   (Original) A method as claimed in claim 23 wherein the step of selecting from among the set further comprises steps of:

generating a plurality of sets of R regeneration points;

evaluating each of the plurality of sets of R regeneration points according to a predetermined criterion; and

selecting the R regeneration points that achieved a highest evaluation among the sets of R regeneration points evaluated.

25.   **(Previously Presented)**   A method as claimed in claim 24 wherein the step of selecting the at least one wavelength further comprises a step of selecting a respective wavelength from a set of available wavelengths in each link between successive pairs of: A, B, and members of the selected set of R regeneration points.

26.   **(Currently Amended)**   A method as claimed in claim ~~18~~ 23 wherein the step of verifying the plausible communications channel, which comprises at least one wavelength, comprises steps of, for each of the at least one wavelength:

parsing the wavelength into links over which it is conveyed;

retrieving parameters of transmission equipment in each of the links that the wavelength is parsed into; and

determining if the transmission over the wavelength is viable by calculating the link budget and determining the settings for the transmission equipment.

27.   **(Previously Presented)**   A method as claimed in claim 26 wherein the step of retrieving parameters comprises any one or more of:

querying a data repository containing fixed data regarding transmission equipment;

querying a data registry to determine a most recent entry of a polled property of the transmission equipment; and

directly accessing the transmission equipment to request a status update.

28.   **(Previously Presented)**   A method as claimed in claim 27 wherein the step of determining comprises steps of:

DOCSOTT: 416745\1

ensuring that the at least one wavelength is not currently used on a link over which it is supposed to span;

ensuring that the links in the wavelengths are operating within established parameters; and

evaluating signal transmission viability across each of the at least one wavelength.

29.   (Original) A method as claimed in claim 28 wherein the step of evaluating further comprises steps of:

generating parameter values for transmission equipment on respective links to serve as coarse grain settings of the respective transmission equipment; and

sending the parameter values to respective transmission equipment.

30.   (Original) A method as claimed in claim 29 further comprising the step of effecting the reconfiguration of the optical transmission components to establish the communications channel.

31.   (Currently Amended)   A system for adaptively controlling communications channels in an agile optical network, the system comprising:

a wavelength and route manager (WRM) that determines a channel to be setup to satisfy a request for service between two network elements (A and B), using a route selection algorithm and at least one generic rule to evaluate a given set of routes between A and B, in order to identify a route;

a route-based ~~wavelength selector~~channel selection algorithm adapted to select at least one available ~~wavelength~~ channel subject to a constraint that the at least one wavelength traces the selected route the channel selection algorithm comprising: a route selector adapted to select a route between A and B from a set of routes in accordance with at least one selection criterion, and a wavelength selector adapted to select the at least one wavelength for the communications channel on the selected route subject to the following

DOCSOTT: 416745\1

Commissioner for Patents
Page 10

constraints: each of the at least one wavelengths is not indicated to be currently used on any section in the route; if regeneration is required, a regenerator is available to regenerate the at least one wavelength in response to regeneration opportunity information; and further adapted to obtain a distance traversed between A and B over the selected route, and to compare the distance with a predefined regeneration threshold in order to estimate a number (R) of regenerations required for a channel on the route, R being used to select R available regeneration points on the route; and

a constraint-based route validator that verifies a viability of the at least one wavelength by calculating a link budget and determining settings for the transmission equipment for supporting the communications channel, and effects the set up of the communications channel between A and B, if the viability is verified.